



PO No	Supplier	Line Item No	Ref No	Terms	Purchased Item	Description	For Part No	Project	Equipment ID	Order Qty	Due Date	Received Quantity	Accounting Job No	Container No	Status	Receive Date	Price/Unit	Aging Days	Past Due	Tot:
PO039449	ACI001-VC	4	1	Net 30	MT-4140-R4.000	AISI 4140 Round Bar				2	4/6/2018	2	S057702	Stock	4/3/2018	\$ 105.09 / ft	0		\$25.	
Total:										2		2								\$195

Plex 4/3/2018 11:20 AM Dart.Dubois.Pascal

Eaton Steel Bar Company Inspection Certificate 1701209

EN 10204:2004-3.1

Customer	BOL	Ship Date	Customer PO	Item	Customer Item	Item Description
	225539	19-Feb-2018	B40059	8556 rev 008	019733	4 HR RD4140TKR 21/24H SBQ QT5F VD Ca-Al-FG MST

All bundles listed below were produced using steel from Heat 12080470 Issued by GERDAU-BRAZIL and were completed from Eaton Steel Job 823764.

Chemistry	Description	Value	Units	Jominy		Description	Value	Units
				PMGT	J30			
C	Carbon	0.41000	PMGT	J32	PMGT	32/16 inch from Quenched End	42	HRC
Mo	Manganese	0.94000	PMGT	J32	PMGT	32/16 inch from Quenched End	42	HRC
P	Phosphorus	0.01400	PMGT	J32	PMGT	32/16 inch from Quenched End	42	HRC
S	Sulfur	0.01400	PMGT	J32	PMGT	32/16 inch from Quenched End	42	HRC
Si	Silicon	0.29000	PMGT	J32	PMGT	32/16 inch from Quenched End	42	HRC
Ni	Nickel	0.09000	PMGT	J32	PMGT	32/16 inch from Quenched End	42	HRC
Cr	Chromium	1.04000	PMGT	J32	PMGT	32/16 inch from Quenched End	42	HRC
Mo	Molybdenum	0.24000	PMGT	J32	PMGT	32/16 inch from Quenched End	42	HRC
Al	Aluminum	0.01700	PMGT	J32	PMGT	32/16 inch from Quenched End	42	HRC
Cu	Copper	0.18000	PMGT	J32	PMGT	32/16 inch from Quenched End	42	HRC
V	Vanadium	0.00400	PMGT	J32	PMGT	32/16 inch from Quenched End	42	HRC
Cb	Columbium	0.00400	PMGT	J32	PMGT	32/16 inch from Quenched End	42	HRC
N	Nitrogen	0.00570	PMGT	J32	PMGT	32/16 inch from Quenched End	42	HRC
DI	Ideal Diameter	6.62910	IN	IN	IN	IN	IN	IN
Description		Value	Units	QUENCH MEDIA	Quench Media Requirements	P&W/O	-	-
SAE J422 OX	SAE J422 Oxide Rating	0.0 - 5.0	NUM	STRESS FREE	Cert stress free	CERTIFIED	-	-
SAE J422 SI	SAE J422 Silicate Rating	0.0 - 5.0	NUM	FT4140-42QT	Quench & Temper	CONFORMS	-	-
MACRO ETCH	Report macro etch results.	*	*	Mill Processing	Description	Value	Units	Units
Geometry	Description	Value	Units	HELT COUNTRY	Melted in Country	BRA	-	-
DIAMETER	Diameter	4.0000 - 4.0625	IN	ROLLED COUNTRY	Rolled in Country	BRA	-	-
Jominy		Value	Units	RED RATIO	Reduction Ratio	7.10	R&D	-
J1	1/16 inch from Quenched End	59	HRC	ASTM Standard	Description	Value	Units	Units
J2	2/16 inch from Quenched End	59	HRC	A193/193M-01	Grade B7	CONFORMS	-	-
J3	3/16 inch from Quenched End	58	HRC	A434-90a-BC	ASTMA BC Tensile and Yield properties	CONFORMS	-	-
J4	4/16 inch from Quenched End	58	HRC	Structure	Description	Value	Units	Units
J5	5/16 inch from Quenched End	58	HRC	PERCENT TM	Percent Tempered Martensite	80 - 100	PCT	-
J6	6/16 inch from Quenched End	57	HRC	MICROSTRUCTURE	Reported Microstructure	TM	-	-
J7	7/16 inch from Quenched End	57	HRC	Tag Number	Qty	Length	-	-
J8	8/16 inch from Quenched End	57	HRC	022-2203726	8858 LBS	22ft10in/21ft10in	-	-
J9	9/16 inch from Quenched End	56	HRC					
J10	10/16 inch from Quenched End	56	HRC					
J11	11/16 inch from Quenched End	55	HRC					
J12	12/16 inch from Quenched End	54	HRC					
J14	14/16 inch from Quenched End	52	HRC					
J15	16/16 inch from Quenched End	51	HRC					
J18	18/16 inch from Quenched End	49	HRC					
J20	20/16 inch from Quenched End	46	HRC					
J22	22/16 inch from Quenched End	43	HRC					
J24	24/16 inch from Quenched End	43	HRC					
J26	26/16 inch from Quenched End	42	HRC					
J28	28/16 inch from Quenched End	42	HRC					

Bundle tags with Eaton Steel identifiers reference the steel grade, heat, purchase order number where applicable, part number, product description and quantity. Material produced in accordance with Eaton Steel's Quality Manual CMH-00002 Rev 0 dated 11/2/2013.

We hereby certify the above to be in conformance, and a true copy of data represented in company records. This steel was not subject to weld repair or exposed to mercury while in the possession of Eaton Steel.
 This document was prepared for use in the manufacture of electronic
 data processing and related equipment.
 Marc Benjamin, Corporate Metallurgist

Tel: 248-388-3434
 Fax: 248-388-1434
<http://www.eatonsteel.com>

PAR E-MAIL LE 02 APR. 2018



GERDAU
CHARQUEADAS

**CERTIFICADO DE QUALIDADE
QUALITY CERTIFICATE**

PART NUMBER 8168		PESO/WEIGHT (KG) 40.553,000	MATERIAL/MATERIAL 705013345	PRODUTO/PRODUCT HOT ROLLED ROUND BAR NO HEAT TREATMENT AS ROLLED	Cert. N° 0000022442												
CLIENTE/CLIENT EATON STEEL BAR COMPANY		QUALIDADE/GRADE 4140TQR		BALOU/SIZE 101,60 mm	CORRIDA/HEAT 12080470												
NORMA/SPECIFICATION SPRC FOR ITEM 8168 006 23.01.2014		Ord. Fornece/Ord-Supply 5336580 - 8108897269		Lote/Batch 1208047006													
Nota Fiscal/Invoice 0000017226		Ord. Fornece/Ord-Supply 5336580 - 81088972888		Peso/Weight (Kg) 22.523,000													
0000017311		Ord. Fornece/Ord-Supply 5336580 - 8108906168		Peso/Weight (Kg) 13.530,000													
0000017692		Ord. Fornece/Ord-Supply 5336580 - 8108906168		Peso/Weight (Kg) 4.500,000													
ANÁLISE QUÍMICA/CHEMICAL COMPOSITION																	
C	Mn	Si	P	S	Cr	Ni	Mo	V	Cr	Al	Ti	Nb	N	B	Pb		
0,410	0,94	0,29	0,014	0,014	1,04	0,09	0,24	0,0040	0,180	0,0120	0,0170	0,0010	0,0040	0,0057	0,0002	0,0010	
H	Ca	As	Sb	DI													
PPM	%	%	%	%													
1,00	0,0008	0,0030	0,0020	0,6291													
ENSAIOS MECÂNICOS/MECHANICAL PROP						Hardness HB 306,00											
ENSAIOS METALÓGRAFICOS/METALLOGRAPHIC TESTS						Austenitic Grain Size											
MICROINCLUSÕES / INCLUSION RATING NUMBER						7											
ASTM/ SAE REGULAR	A - TS 1,5	A - HS 1,0	B - TS 0,0	B - HS 1,5	C - TS 0,0	C - HS 0,0	D - TS 1,0	D - HS 0,0									
SAE REGULAR	Oxide	Silicatos															
MACROGRAFIA/MACROGRAPHY						Blue Fracture (H)											



PART NUMBER		PESO/WEIGHT (KG)		MATERIAL/MATERIAL		QUALIDADE/GRADE		BITOLA/SIZE		PRODUTO/PRODUCT		CERTIFICADO DE QUALIDADE																
0168		40.553.000		705013345		4140TR		101,60 mm		HOT ROLLED ROUND BAR NO HEAT TREATMENT AS ROLLED		Cert. N° 0000022442 CORRIDA/HEAT 12080470																
CLIENTE/CLIENT		EATON STEEL BAR COMPANY																										
OUR MANAGEMENT SYSTEM IS CERTIFIED TO ISO9001/TS16949/ISO14001																												
TEMPERABILIDADE/HARDENABILITY	1/16"	2/16"	3/16"	4/16"	5/16"	6/16"	7/16"	8/16"	9/16"	10/16"	11/16"	12/16"	14/16"	16/16"	18/16"	20/16"	22/16"											
HRC	HRC	HRC	HRC	HRC	HRC	HRC	HRC	HRC	HRC	HRC	HRC	HRC	HRC	HRC	HRC	HRC	6"											
59,5	59,1	58,8	58,2	58,0	57,8	57,5	57,0	56,5	56,0	55,6	54,0	52,5	51,3	49,8	46,5	43,5												
24/16"	26/16"	28/16"	30/16"	32/16"																								
HRC	HRC	HRC	HRC	HRC																								
43,3	42,8	42,7	42,5	42,0																								
GRAU DE REDUÇÃO/REDUCTION RATE																												
6.991 : 1																												
OBSERVAÇÕES/OBSERVATIONS														DEPARTAMENTO DA QUALIDADE / QUALITY DEPARTMENT														
Metallshop route: EAF, LF, VD, CC. Made in Brazil at Gerdau Charqueadas.														BR-MU-CHARQUEADAS-APP. 20.09.2017														
Produced according to ASTM A304 and ASTM A322 Reduction Ratio: 7,1:1 Metall in Brazil Rolled in Brazil																												
ENVIRONMENTAL RECOMMENDATIONS RELATED TO PRODUCTS: In order to contribute with the environment and sustainable development of our productive chain, we recommend to our clients to dispose accordingly the waste related to our products, according to the environmental legislation of your region, state or country.														ANDRÉ L. SILVA FAGUNDES CREA 0682601000														

Lab Services Report



10221 Capital Avenue
Oak Park MI 48237
(248)543-3578 telephone
(248)398-1434 facsimile

Bill To: Apollo Heat Treating and Processing Company, L.L.C.
10400 Capital Avenue
Oak Park, MI
Attn: Randy Call
rcall@apollohtp.com

Ship To: Apollo Heat Treating and Processing Company, L.L.C.
10400 Capital Avenue
Oak Park, MI
Report Date: 12/20/2017
Report ID: 17-4982
Request ID:

This report contains results for the indicated services performed on the following sample(s):

Part No	8556	Finish	HR	Shape	Round	PO#	823764
Size	4.000	Grade	4142	Work Order	823764		

Titan Sample ID	Heat	Customer Sample ID
17-4982-1	12080470	823764 JOB 3173

Steve Avery

Report Approved By: Steve Avery

Mechanical Testing

ASTM E8M-16a

ASTM E10-17

Sample ID	Ultimate Tensile, psi	0.2% Offset Yield, psi	Elongation - Manual, %	Reduction of Area, %	HBW Surface
17-4982-1	153,100	134,400	19	55	313

Test Comments

Mechanicals tested at Midradius



Certificate Number: 2007-01 Any services within a section marked with * are not part of Titan Metallurgy's current A2LA accreditation.
Testing Laboratory

All testing performed by Titan Metallurgy was done at ambient (room) temperature.

Report ID: 17-4982

Page 1 of 1



10400 Capital Avenue • Oak Park, Michigan 48237 • (248) 398-3434

CERTIFICATION OF HEAT TREATMENT

Date: 12 / 29 / 2017

Certification Number: 17 - 0888

Customers Order Number: 823764

Part Number: 8168 - 8556

Heat Number: 12080470

Heat Treat Job Number: 3173

Material: 4140

Quantity: 84 Pcs.

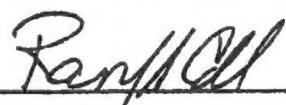
Weight: 83,449 Lbs.

Description: 4.0000" Diameter x 23' 4" Length

Per Specification: ESHT HT4140 - 42QT

	Temperature	Time at Heat	Coolant
Normalized	N/A		
Preheat	N/A		
Austenitized/Hardened	1575 °F	1 Hour 30 Minutes	
Spray Quenched	98.1 °F - 104.9 °F	N/A	Water
Temper	1150 °F	2 Hours 35 Minutes	Air Cooled to Ambient
Temper	N/A		

Method of heat treat monitor, set point thermocouple (Type K). Equipment calibrated per AMS2750E. We hereby certify the above material has been treated in the manner described are correct as contained in the records of Apollo Heat Treating and Processing, LLC.



Randy L. Call
Plant Manager
Apollo Heat Treating & Processing, LLC



10400 Capital Avenue • Oak Park, Michigan 48237 • (248) 398-3434

CERTIFICATION OF HEAT TREATMENT

Date: 12 / 29 / 2017

Certification Number: 17 - 0889

Customer's Order Number: 823764

Part Number: 8168 - 8556

Heat Number: 12080470

Heat Treat Job Number: 3173

Material: 4140

Quantity: 91 Pcs.

Weight: 91,375 Lbs.

Description: 4.0000" Diameter x 23' 4" Length

Per Specification: ESHT HT4140 - 42QT

	Temperature	Time at Heat	Coolant
Normalized	N/A		
Preheat	N/A		
Austenitized/Hardened	1575 °F	1 Hour 30 Minutes	
Spray Quenched	98.1 °F - 104.9 °F	N/A	Water
Temper	1150 °F	2 Hours 35 Minutes	Air Cooled to Ambient
Temper	N/A		

Method of heat treat monitor, set point thermocouple (Type K). Equipment calibrated per AMS2750E. We hereby certify the above material has been treated in the manner described are correct as contained in the records of Apollo Heat Treating and Processing, LLC.

A handwritten signature in black ink, appearing to read "Randy L. Call".

Randy L. Call

Plant Manager

Apollo Heat Treating & Processing, LLC



Dart Aerospace Ltd.
1270 Aberdeen St
Hawkesbury, ON
K6A 1K7
Canada

Tel (613) 632-5200

PURCHASE ORDER PO039449

Supplier:	ACI001-VC Acier Ouellette Inc. 935 Boul. Du Havre Valleyfield QC J6S 5L1 Canada Phone: 800 667 4248 Fax: 450 377 5696	PO No:	PO039449
		PO Date:	3/28/18
		Due Date:	4/6/18
		Purchase Order Revision:	
		Revision Date:	
		Ship-To Contact:	Lavoie, Chantal Phone: clavoie@dartaero.com
Ship To:	1270 Aberdeen Street Hawkesbury ON K6A 1K7 Canada Phone: 613-632-5200	Via:	Ground
		Pymt Terms:	Net 30
		Freight Terms:	
		Special Comments:	QUOTE NO. SOU0094912

E-MAILED
MAR 29 2018

Items										
Line Item	Part	Supplier Part No	Description	Status	Due Date	Order Quantity	Received Quantity	Balance	Unit Price (CAD)	Extended Price
1	MT-4140-S-2.750X5.000		4140 Steel Sheet 2.750 X 5.000 : MAT'L: AISI 4140 / 4142 STEEL SHEET OR PLATE MINIMUM ROCKWELL C = 28 Rc MAXIMUM ROCKWELL C = 32 Rc ASTM A829, AMS 6395 receive ft	Firmed	4/6/18	2.917 ft	0 ft	3 ft	\$142.62889/ft	\$416.05

Line Item Note: 2 PCS CUT TO SIZE 17.500"

2	MT-4140-B-1.000X1.000		4140 Steel Bar 1.000 X 1.000 : AISI 4140N STEEL BAR PER MIL-S-5626, AMS 6382, AMS 6349, AMS 6529 receive ft	Firmed	4/6/18	16 ft	0 ft	16 ft	\$23.0425/ft	\$368.68
3	MT-4140-R1.625		AISI 4140 Round Bar	Firmed	4/6/18	4 ft	0 ft	4 ft	\$39.25/ft	\$157.00
4	MT-4140-R4.000	CUT TO 7" LENGTH	AISI 4140 Round Bar	Firmed	4/6/18	2.33 ft	2.40 ft 4PCS	2 ft	\$105.09442/ft APR 03 2018	\$244.87

Line Item Note: 4 PCS CUT TO 7"

Grand Total: \$1,186.60

Order Notes

DAS
11
9-89

Order Notes

Procurement Quality Clauses
A005 right of entry
A012 chemical and physical test report
A016 personnel qualification
A017 raw material identification (as applicable)
A026 certification of material conformance
A041 quality management system
A042 dart notification by supplier
A043 retention of quality documents
A048 counterfeit parts avoidance, detection, mitigation and disposition program
A049 supplier awareness

Terms & Condition of Purchasing(Suppliers) and Procurement Quality Clauses are an integral part of our AS9100 requirements. To learn in detail, please visit www.dartaerospace.com for further explanation.

Plex 3/28/18 1:37 PM *dart.lavoie.chantal*

MATERIAL RECEIPT INSPECTION FORM

MATERIAL: MT-4140-R4.000
 DATE: APR 03 2018

PO / BATCH NO.: 039449/5057702

MATERIAL CERT REC'D: Yes
 QUANTITY RECEIVED: 2.2 4Pcs
 QUANTITY INSPECTED: 2.2 4Pcs
 QUANTITY REJECTED: 0

THICKNESS ORDERED: 4.000
 THICKNESS RECEIVED: 4.000
 SHEET SIZE ORDERED: N/A
 SHEET SIZE RECEIVED: N/A

DESCRIPTION	NCR (Check Y/N)		COMMENTS
SURFACE DAMAGE	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
CORRECT FINISH	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
CORROSION	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
CORRECT GRAIN DIRECTION	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
CORRECT MATERIAL PER M-DRAWING	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>4140-42QT</u>
CORRECT THICKNESS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
PHOTO REQUIRED	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
CORRECT REF # TO LINK CERT	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>Heat # 12080470</u>
CORRECT MATERIAL IDENTIFICATION	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
CORRECT M# ON THE MATERIAL	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
DOES THIS MATERIAL REQUIRE ENGINEERING SIGN OFF	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
DOES THIS REQUIRE AN EXTRUSION REPORT	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

CUT SAMPLE PIECE OF MATERIAL AND PERFORM A HARDNESS CHECK. RECORD RESULTS BELOW					
TYPE OF MATERIAL SIZE OF TEST SAMPLE HARDNESS / DUROMETER READING	HRC	HRB	DUR A	DUR D	WEBSTER

testers located in the Quality Office

QC 18 INSPECTION	ENGINEERING SIGNOFF (if required)
INSPECTED BY: <u>DAS</u> DATE: <u>11 APR 03 2018</u>	SIGNED OFF BY: _____ DATE: _____

Attach this inspection sheet with the corresponding material cert and remit to be scanned and received in

SPECIFICATION CONTROL DRAWING

1	2	3	4	5	6	7	8
REV.		DESCRIPTION					
A		NEW ISSUE					

PURCHASE MATERIAL : AISI 4140 QUENCHED & TEMPERED STEEL ROUND BAR
SPECIFICATION : ASTM 4140 QT or ASTM 4142 QT
PART NUMBER : MT-4140QT-R(D.DDD)
WHERE "D,DDD" = DIAMETER IN INCHES
E.G. 5 1/8" ROUND BAR = MT-4140QT-R0.625